

# The Future of Care

## PART I: THE PATIENT EXPERIENCE

The next decade is expected to bring a raft of medical advances that not only will vastly improve patient care but also change how that care is delivered. In a two-part series, *Hospitals & Health Networks* is examining what the future holds in both arenas. This first installment delves into clinical innovations predicted by 2020 in three types of diseases: diabetes, heart disease and cancer.

Interviews with various experts show that many of the medical advances of the next decade will accelerate the trend toward personalized medicine. The result will be more effective treatment and better patient outcomes, they say.

Discoveries in genomics and proteomics will play a major role in this shift and, in many cases, drive major changes in prevention, diagnosis and treatment of disease. "Within the next 10 years we will learn how to use what we learned about the human genome eight years ago," says Edward Winslow, M.D., associate vice president at Sg2, a suburban Chicago health care consulting firm. "We have already got some genomic diagnostic information, but to date, we haven't been able to incorporate it into what we do routinely."

The shift toward personalized medicine driven by genomics already has taken off in oncology, for example, Winslow notes. Researchers have discovered genetic mutations that drive certain cancers and have developed targeted drugs that slow or shut down tumors. Treatment guidelines for some cancers, such as colorectal and breast, call for genetic tests to determine if patients should get targeted therapy.

New or improved drugs, procedures and technology will give physicians new options and, thus, more opportunity to match treatment with specific patient needs, several experts say.

This special foldout section is not meant to capture the entire breath of changes forthcoming in diagnostics and care delivery; it is not a complete forecast. Rather, it is meant to be illustrative of the significant advances forthcoming and, hopefully, spur some thought about what hospitals need to do to adapt.

The second installment of the series will look at how in the next decade the formation of integrated health care delivery networks will enable the delivery of quality care to patients in the appropriate setting.

H&HN

**How We Did It:** This gatefold was produced by researching published studies and articles and conducting interviews with hospital and industry executives.  
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### HEART DISEASE

In 2020 a big "gee whiz" factor in heart disease treatment will be process measures that make sure patients are getting needed therapies, says Edward Winslow, M.D., associate vice president at Sg2, a suburban Chicago health care consulting firm. Patients are not always getting the recommended treatment now, especially in heart failure, he says. "In the ones who don't respond the way they're supposed to, we'll need to start looking for something unique to try." Meanwhile, advancements in science and technology will improve many treatments and expand them to new patient populations, says Brian Contos, managing director at The Advisory Board Company, a research and consulting firm based in Washington, D.C. Pharmacogenomics—the study of how genetics impact the body's response to drugs—will allow physicians to personalize dosing of some medications based on the patient's genotype, Winslow predicts. ●

#### ALTERNATIVE TO TRANSPLANTS

Ventricular assist devices, now used mostly as a bridge to heart transplant, will be a destination therapy for more patients with late-stage heart failure, Contos says. Smaller devices and more durable parts will help drive the trend. This option will add years of life for patients who are too old or sick to handle a heart transplant and the resulting anti-rejection therapy. "It is something that will change the way people think about the problem," Winslow says.

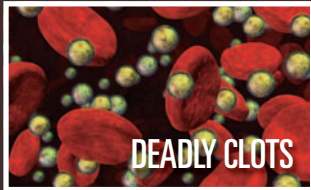
#### INNOVATIVE VALVES

Percutaneous valve replacement likely will be the most disruptive technology since drug-eluting stents, Contos says. This currently experimental procedure, done in the cath lab, corrects the severe narrowing of the aortic valve opening. It will offer a new option to patients and be especially significant for those who are too frail to undergo the current therapy, open heart valve surgery.

#### STEM CELLS



**Stem cell therapy closer:** Researchers will build upon encouraging early results of studies on stem cell-based repair in subsets of heart attack and heart failure patients, Contos says. This treatment avenue still won't have progressed enough to cause a shift in the treatment paradigm for cardiovascular disease. But in 2020 research and experimentation will provide the foundation for future changes in clinical practice that could eventually augment or replace today's mainstay interventions, Contos adds.



**Safer clot busters:** A simple genetic test will allow physicians to better tailor warfarin (Coumadin) dosing decisions for each patient. This will make the drug used to prevent blood clots, often in patients with arrhythmia, more effective and reduce the likelihood of serious complications, such as internal bleeding, Winslow says. Alternatives to warfarin that are as effective but pose less risk of bleeding will be on the market, he adds.

#### ZAPPING TO GET RHYTHM

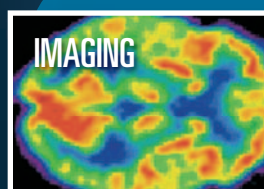
More patients will undergo catheter radio-frequency ablation to treat atrial fibrillation, the most common heart arrhythmia. In the procedure, a catheter is threaded through the patient's blood vessel to reach and then zap the abnormal heart tissue causing the arrhythmia. The treatment will be more readily applied to patients across the spectrum of AF, including patients with challenging comorbidities, such as heart failure, Contos says. New catheters and energy sources, such as cryoablation, will improve safety and efficacy across the board, increasingly making AF ablation a first-line treatment option. The promise of very low recurrence rates and the possibility of ending life-long anticoagulation therapy will spur greater utilization, Contos adds.

### CANCER

In 2020 cancer prevention, diagnosis and treatment will be even more personalized than it is today. Findings in genetics, proteomics and infectious disease will drive much of this change. Early detection and treatment will be more common. Some cancers could be eliminated. Others will be treated as chronic diseases managed by medication, says Edward Winslow, M.D., associate vice president at Sg2. However, this carries the risk that, as with other chronic conditions, patient compliance with treatment regimens might slide, says Richard L. Schilsky, M.D., immediate past president of the American Society of Clinical Oncology and chief of hematology and oncology at University of Chicago Medical Center. Although turning cancer from a killer into a chronic disease is undoubtedly an improvement, it's not as good as a cure. For this reason, the medical community still will be striving for that goal. Here is a snapshot of what 2020 may bring. ●

**A shot of prevention:** More cancers will be linked to infectious diseases, and preventive vaccines will be developed, Schilsky predicts. This means that just as women today can now get the Gardasil vaccine to prevent cervical cancer, people will be able to get childhood vaccines to prevent other cancers. Already, the Epstein-Barr virus, which can cause infectious mononucleosis, has been linked to a type of head and neck cancer and a certain lymphoma. Vaccine campaigns could wipe out some cancers. Meanwhile, other types of cancer prevention agents will be found, Schilsky predicts. Today, there is evidence that aspirin or Celebrex can prevent colon polyps and perhaps cancer, and a trial is looking at the use of Cox-2 inhibitors to prevent an esophageal condition that occurs in some patients with chronic gastric reflux and that can become cancerous, Schilsky notes.

**A shot of treatment:** Therapeutic vaccines that attack cancer after it has manifested itself will be available. Two likely targets are lymphoma and prostate cancer, Schilsky says. A clinical study of a treatment vaccine that shows promise in slowing advanced prostate cancer is currently under way.



**Spying on tumors:** Advances in functional imaging will allow physicians to determine in days, rather than months, whether a therapy is working, Schilsky says. Examples include functional MRI to assess blood flow to a tumor and new isotopes for PET scans that show whether a tumor's genes are active and its cells are dividing. Using this imaging information, doctors will be able to switch quickly to a new therapy if the first one isn't working.

#### NANOTECHNOLOGY MATURES

Nanotechnology likely will have developed enough to have the capacity to deliver chemotherapies directly to cancer cells. Traditional chemotherapy travels all over the body, causing unwanted side effects. Nanotechnology, while still an IV treatment, will have overcome that problem for some cancers. Nanosensors injected into the body that enable real-time monitoring of patient's cancer biomarkers also are likely to have been developed.

#### EARLY SIGNAL SYSTEMS



Discoveries in proteomics will have identified proteins or protein patterns that are early signals of cancers, Schilsky says. Doctors will look for the presence of these substances in patients' blood. This technique will be coupled with better risk assessments, including DNA tests similar to that for early onset breast cancer, or BRCA1. Protein screening will be reserved for people who have higher risk due to their family or personal histories, exposure to carcinogens, or DNA profile. This early warning system is particularly important for people at risk of hard-to-detect cancers, such as ovarian and pancreatic.

#### GENETIC TESTING

**Targeting therapy:** Genetic tests on patients' tumors will become more common because more targeted therapies will be on the market that shut down the tumor mutation driving that person's cancer. These drugs slow or stop the cancer's progression. At the same time, genetic tests on the patient's blood will indicate which drug will be the most effective for that patient and whether he or she will be more susceptible to its side effects, Schilsky predicts.

### DIABETES

The obesity epidemic is fueling a surge in diabetes cases. Today, nearly 24 million Americans have the disease. Diabetes experts hope that in the next decade an emphasis on early lifestyle interventions, combined with new and improved medications, will delay the onset of Type 2 disease in many patients. Diabetes treatment will continue to stretch beyond controlling blood sugar and into slowing the disease's progression and protecting against its complications, such as blindness, amputation and renal failure, says Eugenio Cersosimo, M.D., associate professor of medicine and medical director of clinical research at the Texas Diabetes Institute. New medication options will allow physicians to tailor therapy based on the patient's health and disease severity, says Yehuda Handelsman, M.D., medical director of the Metabolic Institute of America and vice president of the American Association of Clinical Endocrinologists. In the less-common Type 1 diabetes, major advancements in technology and stem cell research are expected to revolutionize treatment, he adds. ●

#### INCRETINS

Long-acting incretins will decrease injection frequency from daily to once a week or even once a month or more, Cersosimo predicts. Already, a weekly incretin injection is close to Food & Drug Administration approval.



**Drugs for prevention:** Medications that are now available only for people who have Type 2 diabetes will be prescribed to adults who are at serious risk of developing the disease in a few years but who are asymptomatic, Cersosimo predicts. These drugs are glitazones, which target insulin resistance, and incretins, which improve insulin production. Preventive use will delay disease onset and lower the risk of complications. In patients who have developed Type 2 diabetes, medications from these two classes could be used in conjunction.

#### Early Intervention:

Researchers likely won't have discovered all the genes that together cause Type 2 diabetes. However, doctors will use family histories to determine who is at risk and begin lifestyle interventions in childhood to stave off onset of the disease, Cersosimo says. Success hinges on patient compliance.

#### ARTIFICIAL PANCREAS

Care for Type 1, or childhood-onset, diabetes will be revolutionized by technology combining a continuous glucose monitor with an implantable pump that automatically dispenses insulin, Handelsman predicts. This artificial pancreas will provide better control of glucose levels because patients will no longer have to make dosing decisions. It also will help Type 2 diabetics who have lost pancreatic function.

#### INSULIN A LAST RESORT

Early intervention through lifestyle changes and drugs will prevent many Type 2 diabetics from reaching the point at which their pancreases are so compromised that they need insulin injections. It will be a treatment of last resort used by patients for whom other therapies have failed, Cersosimo says.

#### STEM CELL THERAPY

Advances in coaxing Type 1 diabetics' stem cells into pancreatic cells may progress enough to practically eliminate the disease, Handelsman predicts. To succeed, this therapy would have to be combined with drugs that stop Type 1 diabetics' immune systems from destroying the new islet cells, which produce insulin.

